

Lith.

229



Hist. natural. Regnum animal. System.
& methodi 748.

Lith. - N^o 229.

SPATOGENESIA.

THE
ORIGIN and NATURE
OF
SPAR;
ITS QUALITIES AND USES:
WITH
A DESCRIPTION AND HISTORY
OF
EIGHTY-NINE SPECIES;

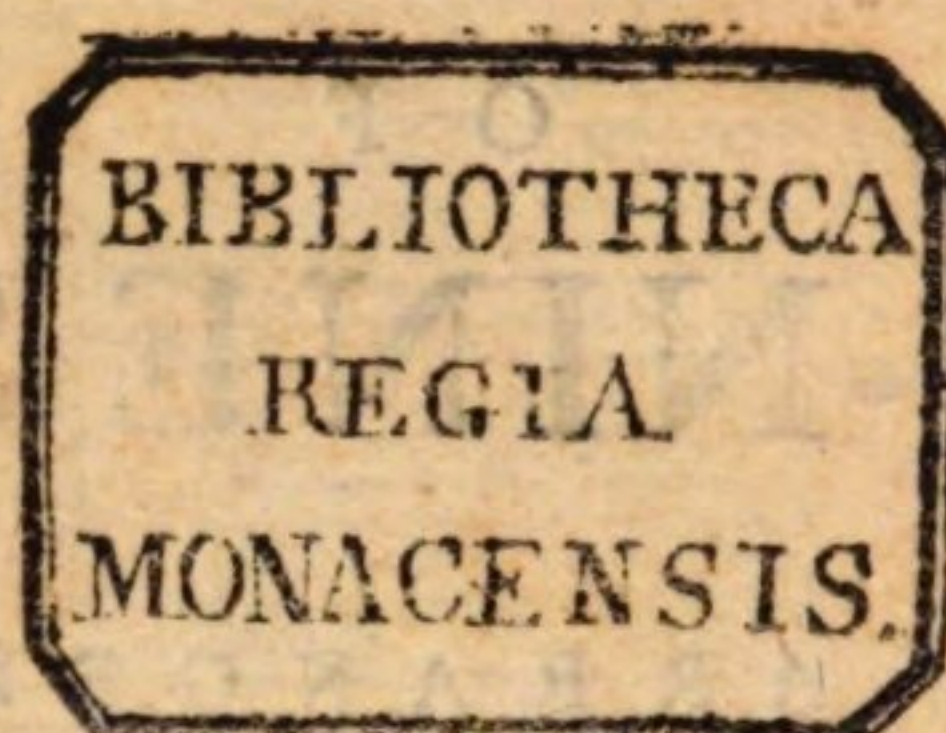
ARRANGED,
1. In an ARTIFICIAL }
AND } METHOD.
2. In a NATURAL }

A
SPECIMEN
OF A
GENERAL DISTRIBUTION OF FOSSILS.

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M.DCC.LXXII.



O F T H E O R I G I N of S P A R.

THE Series of Fossils make one great circle ; for ever returning into itself.

There are a few primitive bodies ; Chalk, Clay, Bitumen, Talc, and the Mineral Acid.

These, variously mixed, form many different compound Fossils: which mingling, in some places, farther with one another, give decompounds.

These (in other places) give up their several primitives again to water: which delivers them pure in some other parts ; ready to form mixt and compound bodies again.

To trace them thro' these combinations, and to their natural analysis again, is the whole business of the Student in this science: for here is no distinction but by mixture: no origin from egg, or seed.

A great deal of pure Clay mixed with a little quantity of various Stones, forms the different Clays.

And a great deal of Stone with a little of the Clays, forms the various species of Stones.

An instance of this course of nature appears in the philosophic History of Spar.

1. The primitives, as we have seen, are,
Water, Bitumen, Chalk, Clay, Talc, and Mineral Acid:
To these, the operations of the air, and fire give great powers of acting. We thus find
2. *Heavy Vapours*, form'd of air, and much water. These, pervading all things,
3. Meet the Mineral Acid ¹, and uniting with it; if they run clear to the surface, afford Medicinal springs; but
4. Thus united, they may fall upon Bitumen: this is no-where more frequent than in Limestone Rocks; and often stands in puddles, in their natural hollows ².
5. By this mixture, uniting in its course, is form'd a real, tho' a fluid Sulphur: for Sulphur is nothing else; nor can be form'd by any other means ³.
6. This Sulphur, not yet concreted, passes in its

¹ The Electric Æther of the under world; present every where, but only seen concentrated, or in its mixtures. It affects some things, Bitumen most: and avoids others.

² At Naples; in the Venetian Territories; and in Persia, this is very common.

³ Absolute Sulphur may be made by art with ease and certainty this way. The Acid of Vitriol, with any thing inflammable, affords it.

liquid form, thro' the pores of the Limestone; dissolving part of its purer Chalk as it goes ⁴.

7. Water thus saturated with the principles of Sulphur, and with Chalk, keeps on its gradual course horizontally thro' the same Lime Rock, till it meets a fissure; a perpendicular crack, or opening; dividing one part of the rock from another. Here it ouzes forth: and meeting with a lighter air, hangs; and evaporates slowly.

8. Slow evaporation, and perfect rest, are the requisites of crystalization. The Sulphur and pure Chalk thus united, form one solid body; which crystalizing gradually, appears in regular rhomboidal particles: and is the substance we call Spar ⁵.

⁴ Limestone is only coloured, hardened Chalk; and Marble is the same. Marble is a purer Limestone, and Limestone a coarser Marble.

⁵ Spar supposed to be one thing, is therefore a mix'd body, and so are the purest Salts. We can make a substance of the nature of Spar, by crystalizing the lixivium of Lime and Sulphur.

NATIVE FOSSILS.

CLASS III.

SPAR,

SPATUM.

A pure Fossil ; composed of Brittle Rhombs.

SPAR is known from Talc by its want of elasticity ;

—from Selenite by its want of flexibility ;

—from Crystal by its dullness, and by fermenting with Acids.

It is heavier than any of the three other pellucid Fossils ; and is known from all bodies in the world (when pure enough to be seen through) by its doubling lines laid under ; and view'd through it.

This last property has been supposed peculiar to that species of Spar call'd Island Crystal ; and the greatest writers, Linnæus, Wallerius, Cronstedt, and the long *et cætera*, have separated that body from the pure Rhombic Spar ; which they supposed not to have the double refraction. But this power resides in all Spar I have examined : and is of its nature : as it arises from the internal construction of the body, which is made up of smaller Rhombs, apply'd one to another.

The

The very atoms of Spar are Rhombic; and those smallest pieces into which it may be separated by gentle Acids, without solution, apply'd to the microscope over a line proportionably fine, have the same power.

No body has this construction except Spar; therefore no other natural or artificial substance has this power of double refraction. Even Sir Isaac Newton has said, Crystal has something of this power; in vain: for no authority can stand against the testimony of the senses. All different mediums vary in refraction; but this peculiar power resides only in a pellucid body formed of connected Rhombs.

The state of refraction in the pellucid natural bodies is this,

1. Talc in thick masses elevates the line.
2. Selenite waves it.
3. Crystal distorts it.
4. Spar gives it double.

All Spar does this, even that which takes the form of Crystal, in Pyramids, and Columns: therefore even the variously angulated forms of Spar are composed of Rhombs; and the construction of Spar, and of Crystal, are perfectly different, even while their forms are the same.

Spar is seldom found original, and free: a few pure Rhombs;

Rhombs; and two Columns, double pointed, which were dug in the Hartz Forest; are all I have of it.

Nature has mixed its particles among the matter of the Marbles and Limestones; from whence it is washed forth by the pervading water, and left slowly by it, in their cracks and fissures; where it assumes these various forms:

1. Pure Rhombs of a larger size.
2. Rude masses, form'd of coarse connected Rhombs.
3. Plates composed of connected Rhombs.
4. Columnar, Pyramidal, and Cubic Figures, fix'd upon the surface of these rude masses.

In this latter case the rude mass continues uncolour'd, and is the Root; and the Columnar or Pyramidal Figures rise from it frequently yellow, often of other colours: these cut into a kind of Gems, but still have the double refraction equally with that part we call the Root.

5. Icicles and Dropstones.

That the Spar form'd in fissures of rocks, is thus wash'd out of the Limestone itself is certain:

Because none but Limestone Rocks have Spar in their fissures; Rocks of a crystalline matter, or form'd of vitrifiable Stone, have Crystal; never Spar in their cracks.

Linnæus wonders at the nature of that force which split the Rocks into these cracks : but probably the cause is very familiar ; they were formed moist, and crack'd in drying.

Spar grows continually ; for wheresoever there is a crack in a Limestone Rock, new, or old ; Spar always fills it ; and over-runs the surface.

Letters cut hollow in a living Rock of Limestone, fill up, in a course of years, with Spar ; and what were made in Creux are found in Relief. This has been seen in Gothland by the eminent Swede ; and in the grotto of Antiparos by Tournefort. The very time may be determined by the dates, which are often a part of the inscription ; but it is always long. The Spar stands higher as the time is more distant : and has been seen in some places a quarter of an inch above the level of the surface.

If there could want a proof of the continual growth of Spar, the Stalactites would shew it ; and the incrustations, in what are called our petrifying springs ; but that is a fouler sort : there is in Norway a pyramid of Spar two inches long, which was once mine ; in which two branches of the solid Heath moss, or Lichen, are perfectly embodied.

It has been thought the Spar in cracks of Rocks was brought from elsewhere by water ; or was and is originally in all water : the latter is the opinion of Linnæus ;

Linnaeus ; Henkell maintains the former. But if either were the case, Spar would be sometimes found in Vitrescent Rocks, and Crystal in those of Limestone ; which observation denies.

Spar they say will be formed where water can be retain'd ; but indeed also where it cannot ; 'tis enough that it ouzes slowly : nay, not water alone dissolves Spar ; [but it can be retain'd in vapour. I have from Cornwall incrustations of true Stalactite, form'd in the pipes of fire engines in the mines, at heights to which the water never ascends, by many feet ; but only vapour.

Mundick is also thus a creature of the air, in many places. I have trigonal pyramids of Spar, which hung from the top of the Bauman's Cave, in the Hartz, covered with Cubic Mundick ; there is none in the Spar itself ; and from the particular circumstances of the specimen, water could not have lodg'd upon it, only vapour.

Spar is one thing, of one weight, one hardness, and when pure can never be mistaken for any other Fossil. It is liable to have other bodies mixt with it ; and to be altered in its condition by that mixture : but 'tis itself the same. Wallerius distinguishes three degrees of hardness in this Fossil ; but they are owing to those mixtures ; the least hard is the true condition of Spar ; the other degrees arise from iron, or other additions.

It is the opinion of Linnæus, that Spar owes its angulated form to Sea Salt; and the Crystals to other Salts: but there is no warrant in nature for this judgement. Salts are acrid, and dissolve in water. These Fossils have neither of those qualities: and who shall tell us that the property of forming itself into regularly angulated Figures is peculiar to Salts? We have no authority to believe it is wanting in Crystal, and Spar; and we have the evidence of our senses that they have it.

The ingenious and ingenious Croustedt well observes, these Figures ought not to be ascribed to Salts, till the presence of such Salts can be prov'd in them.

The calcarious nature of Spar is of its essence; and no form, nor all the other characters in the world, could constitute a thing a Spar, that wanted this. They all ferment with Acids, and they burn to Lime: nor is this latter quality equivocal, as some would think, because by the fire of a great burning glass, Spar vitrifies. This is not the fire, when we speak of Lime; and it can be a test of nothing; because all things vitrify before it: that is the extream force of fire: and the ultimate effect of fire on all bodies is vitrification.

Linnæus says, the Spar he calls Natro-spatosum, scarce does effervesce with Acids: and it may be added, that the particles of that Spar are scarcely at all Rhombic: Spar and Crystal are mixt in those bodies;

and they have mixt qualities ; but still as there is some Spar, there is some Effervescence.

'Tis vain to give the forms of Spar to Natrum; for we not only find no Natrum there, but different Spars have forms of different Salts ; and the great patron of the Salt System allows, that some of them affect the various angulated Figures of Alum, Sea Salt, Vitriol, and the rest. 'Tis true, they resemble those forms ; but they have not those forms exactly : nor is either of these, or any other Salt whatever, to be found existing in any of them.

But whither will not the wind of Theory blow even the steadiest judgements : the foremost of the writers, who favour this System, because there are in Spars certain forms that do not agree with those of any known Salt, fancies for the formation of these that there exist Salts, not otherwise known to us, but by this operation. When Theory can reach this height, it may do what it pleases : to create Causes, because we see Effects that seem to us to require them, is to make all things easy ; and at the cheapest rate.

If we can ever bring Spar, after solution, to recrytallize, as Salt ; we shall see all things explained in this particular. 'Tis what I have try'd four years, with poor success ; and I have now requested the ablest chymist that we have, to join with me in the attempt. What may arise under his experienced hand, I know not : all I have found is, that the swifter the fluid is evaporated,

porated, the coarser is the matter left behind ; and the more length of time is given, the nearer it approaches to a promise of Crystals.

I think when this shall be accomplish'd, we shall find all Spar to be but one thing ; differing only according to the other matters mixed with it. 'Tis said, the Selenite powder'd and mixt in water, affords Crystals ; and Kahler gives the authority of an eminent metallurgist for it : with me neither has this succeeded yet : but I have no despair ; and tho' it never should succeed with me, it may with others : when that is seen, the other, more important as it is, need not be supposed impossible.

Nothing is more familiar than the production of what it is the custom to call, Selenitical Salts ; Urine affords them ; and some preparations of Sulphur ; but to recrystallize Selenite is, to produce, from a clear fluid, pellucid dodecahedral Rhombs, flexile, not elastic, and not soluble again in water : and he who shall effect this, need not despair of recrystallizing also Spar.

The Salts in Urine that has stood long come nearer the nature of Fossils than any thing we know ; and Tartar, form'd from Wine, is very difficult of solution : yet both these may be melted in pure water. The Salt produced by slow crystalization from a Lixivium of Lime and Sulphur, comes nearest of all to Spar ; but still it is but an approach ; and not a same-

ness : as he who is well acquainted with all the qualities of the vitriolated Tartar will perceive : nor do I conceive Henkel's receipt, form'd on the same foundation, would go any farther : but till men speak plain, 'tis vain to war against their buried meaning.

In fine the formation of Spar is yet a subject of enquiry : its atoms are all Spar ; each particle into which we can without violence divide it, is the same in all respects as the whole : and as the Fossil world admits no generation, or birth, by egg, or seed, it seems most probable that all the variety of forms in which we see this Protean Mineral, are owing to no cause beside the arrangement of Rhombs into as many forms as they are capable of producing. It fills the cracks of its own rocks : and of no other : for Crystal Columns rise from crystalline Rocks ; and from Metallic Masses, fractur'd, grow Pyritæ ; each separated from the great mixt body we see split ; and each form'd into Figures by its own laws, without the intervention of Salt, or other matter.

We find hollow Crystals, and we have hollow Pyramids of Spar ; but 'tis a rash thought, tho' of a great man, to imagine that a Crystal of Salt was first form'd in these cases ; and when the stony coat was finished over, it melted away again : this is imagination : but there is not a hollow Stalactite that may not shew the senses, and convince the reason, that this shell of Spar, or Crystal, may be form'd without a solid nucleus.

There

There are no entire Rocks of Spar; and they who thought they had seen such of Crystal, perhaps mistook pure Ice for them. Both Spar and Crystal rise in general from foul Stones; and they who thought Ice grew to them in time, were scarce more pardonable than such as took Ice for them. Scheukzer has seen the difficulty of accounting for their forms, and joined the lamentation of Philosophers upon that subject; for the Salt System was not then in being: but the old Pliny has not only lamented this difficulty, but assigned its cause; and this a cause to overthrow that system utterly: it is, that tho' the Figures be all regular, they are not all alike; or all resolvable into the same laws.

'Tis an invidious office, and unpleasing, to dwell upon the errors of those who wrote before; but these are so receiv'd, and so establish'd, that there is no other way to truth.

Wallerius says, that Spar is composed of Rhombic and Pyramidal particles: and therefore breaks into both these forms. It is unwillingly I dissent in a few particulars, from an author with whom reason and observation command me to agree in a great many: but this is a doctrine which strikes at the root of all accurate knowledge in respect of this body.

By this account Spar would be two things, not one: its atoms would have two Figures; and we should lose the great distinction by which it is kept
separate

separate from all other bodies. I have examined this point with all possible attention ; and find the pyramidal Figures of Spar, whether in greater or smaller pieces, to be a secondary form ; composed always of Rhombs : but the Rhombic Figure never to have any form in its constituent parts beside its own. The Pyramids, great or small, separate into Rhombs ; the Rhombs never into Pyramids. The true way of dividing Spar is, by an Acid, carefully manag'd ; for the parts are always separated, before they are dissolved.

It is a singular and a just observation of the same author, that no pentagonal Spar has ever been found ; tho' angles in most other numbers are frequent ; but this is not to be attributed with him, to an imaginary Salt, Alcaline, and Muriatic ; it rests upon a much more solid base : which is, that the particular Figure of the Rhombs of Spar, admit the constructing any other angulated form, only not pentagonal.

It has been said, that Island Crystal shines in the dark after it has been calcin'd in manner of the Bolonian Stone ; but this is not particular to that Species : it is the quality of all Spar, as Spar ; only there requires great nicety in the calcination : perhaps Selenite also has this power. Linnæus refers the Bolonian Stone to Spars : to me it has appear'd rather a Selenite ; and of all bodies in nature, most of kin to that species of Selenite we call the Star, upon the waxen vein. I have therefore retain'd it in that place, till more of this scarce Fossil comes in my way for trial : if
it

it prove Spar, 'tis easily removed into that Class ; and thus, and only thus, we can arrive at truth ; after a thousand errors.

That the Hog Spar affords Flowers on sublimation, has been urged as a great proof of its containing Salts of some kind or other ; known or unknown : but surely this property is more naturally resolved into another source. All Bitumens yield flowers on sublimation ; and we have the testimony of our senses to the presence of a Bitumen in the Lapis Suillus : it stinks of it. Nay more, there is a smell of Sulphur in all Spar, when calcined : Henkel and Wallerius, as well as I, have found it ; and if we could give way to any thought of secondary forms, in a Fossil whose construction appears perfectly homogeneous, and simple, my sense of it would be, not to seek them in imaginary Salts, but real Sulphur.

We see the way art imitates it best, is by the Crystals of a liquor in which Lime and Sulphur have been boil'd. Sulphur is thus disclosed on the calcining of Spar ; and for the other ingredient, Lime, we cannot be at a loss ; since it has been observed, no Spar is ever produced in cracks of any rocks, except those of Limestone : nay, and what may strengthen this opinion, the Lime of Spar is weaker than that of Limestone, which, a little Sulphur may cause. All this, is but conjecture ; and is delivered as such, and no other ; but yet it rests on the testimonies of the senses ; not on the flights of the imagination : and it is by conjecture,

ture, in these dark and difficult researches, we must arrive at truth.

I claim no better authority for many of the particular observations here, than for this general one; they are indeed all founded on examination, and experiments, now made on the occasion; but they are examinations and experiments made only on the bodies in my own scanty store: I invite, I solicit, and entreat with my best earnestness, others to repeat them on their own. If they answer as in mine, the doctrines are establish'd; if they differ, there is no one in the world to whom that truth will be more welcome than to myself. To equivocate about an error, is pitiful; to attempt to justify it, is disingenuous: no man should be ashamed of setting right his own mistakes (especially in matters where mistakes are unavoidable) whether by his own or others observation. With how many hundred errors did the *Species Plantarum* make its first appearance; how many of them have been rectify'd; and how many yet remain to be set right? Yet no one ever blamed Linnæus for his first conjectures; nor has the world seen any other book of Science of equal value.

Such errors are the children of imperfect information; and must be found in all who attempt to write for general utility.

Let others therefore freely repeat these my experiments, and add more of their own; and with
an

an honest freedom tell the result of all. My single attention can only make a few experiments, where true knowledge demands a thousand : but the result of different trials will bring forth truth.

It never was more needed in Philosophy than in the part before us ; for with all the plausibility of system, we cannot but perceive upon this free and fair enquiry, that the Student in Fossils has yet to work upon a chaos : and that the paths into a better light, are stop'd and clos'd up utterly : not by ignorance ; but what is much worse, by authenticated error ; authenticated even by greatest names. We must unwind this Charm, if ever we hope to gain the right clue to lead us thro' the labyrinth of nature : we must break the fated Talisman ; and all the seemingly impregnable structures will vanish : the ground will be clear before us ; and if we lose ourselves in the open way, 'tis easy to be set right again.

SPAR form'd by nature, as above related, may either concrete in its pure state as soon as made ; or it may pass while yet fluid, thro' various strata of Earthy, Saline, Mineral, and other matter, and receive great changes both in form and colour from them : it may appear to us therefore, according to these circumstances, either
 in its own pure state of a colourless Rhomb ;
 or foul'd by earths ; or ting'd by metals ;
 or plated, by an admixture of Talc ;
 or render'd cubic by the natrane Marle ; and those
 cubes stain'd to a mimickry of Gems by metals ;

D

or

or it may be shap'd into Polygons by an aluminous earth ;

or thrown into Pyramids, with or without Columns, by the Salts of Mineral Waters :

Or from the mere nature of its concretion, it may appear as curtains spread upon a wall ;

as Icicles hanging from a roof ;

or Globules drop'd upon the floor ;

or as a coat upon mosses, or shells, or various other matters.

According to these accidents it may be thrown into a kind of method, under the terms Genus and Species, to great advantage. The obvious Characters giving an artificial method ; and the consideration of their Origin a natural one.

S P A R.

O R D E R I.

Retaining its natural Figure.

G E N U S I.

P U R E S P A R.

R H O M B I T E S.

Spar in form of Rhombs.

This is either pure as it concretes alone; or variously stain'd and colour'd by admixtures.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	C O L O U R.	Q U A L I T I E S.	P L A C E.	U S E S.
I. S O F T S P A R.							
Small Rhombs	tender	very heavy	glossy	C O L O U R - L E S S.	soft	Hartz forest	a delicate, but weak lime.
2. I C E L A N D S P A R.							
Large Rhombs	friable	heavy	glossy	C O L O U R - L E S S.	smooth	Iceland, Switzerland, &c.	double refraction.
3. M I L K Y S P A R.							
Irregular Rhombs	brittle	very heavy	dull	MILKY WHITE	rugged	Derbyshire	lime.
4. T O P A Z S P A R.							
Connected Rhombs	hard	very heavy	crystalline	P A L E Y E L L O W	fatty	Germany	false gem.

Rhombites
Pellucida.
N.Spatum Speculare
Duplicans.
L.Spatum
Compactum.
L.Spatum Speculare
Flavescens.
L.

Spatum Rubrum
Compactum.
L.

Spatum Speculare
Virescens.

Spatum Speculare
Cærulescens.
L.

Rhombites
Opalina.
N.

Spatum Compactum
Flavescens.
L.

Yorkshire

Germany

Germany

Brazils

Norway,
England

STRONG
RED.

GREEN

PALE BLUE

CHANGE-
ABLE GREY

DULL
YELLOW

dull

bright

perfectly
polished

clouded

scaly

heavy

heavy

heavy

very heavy

heavy

5. GARNET SPAR.

Confus'd
Rhombs

soft

6. EMERALD SPAR.

Small
Rhombs

hard

7. SAPPHIRE SPAR.

United
Rhombs

very hard

8. OPALINE SPAR.

Connected
Rhombs

brittle

9. YELLOW RHOMBIC SPAR.

Rude masses
breaking in
Rhombs.

friable

glimmer-
ing.

lime.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
10. BLUE GREEN RHOMBIC SPAR.							
Rough Lumps	shattery	light	cracky	POOR GREEN	wavy	Germany	Spatum Compactum Virefcens. L. lime.
11. ORANGE SPAR.							
Large Rhomb	shattery	heavy	crackled	ORANGE COLOUR	streaky	Germany	Rhombites Aurantiaca. N. lime.
12. BROWN RHOMBIC SPAR.							
Great rude Lumps	shattery	heavy	irregular, flaky	LIGHT BROWN	harsh	England	Alumen Quartzofum. L. lime.
13. BLACK RHOMBIC SPAR.							
Small con- nected Rhomb	very hard	very heavy	scaly	BLACKISH	hard	Cornwall	Le Spath Cubique Noiratre. W. a tin ore

SPAR.

ORDER II.

Affecting the Figure of Talc.

GENUS I.

PLATED SPAR.

PAROPSIS.

Spar formed into broad, flat Flakes.

Spar assumes this Figure after passing thro' beds of Talc.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. CLEAR FLAKY SPAR.							
Irregular, large flakes	brittle	light	glossy	COLOUR- LESS	unequal	Norway	for windows.
2. WHITE FLAKY SPAR.							
Uneven cakes	very brittle	heavy	rough	MILKY	harsh	Sweden	lime.
3. WAVY SPAR.							
Flat cakes	brittle	light	undulated	GREY	fatty	Denmark	lime.

Spatum
Fiffle.
L.Spatum Aqueum
Hartenfe.
W.Spatum
Undatum.
L.

SPARR.

ORDER III.

Affecting the Figures of the Crystals.

FE

FLUORES.

GENUS I.

TWO-POINTED SPAR.

FLUOR BICUSPIDATUS.

Composed of two hexagonal Pyramids, with an intermediate hexagonal Column.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. SALBERG SPAR.							
Small	soft	very heavy	polish'd	COLOUR- LESS	bitumi- nous	the Salberg hills in Asbestos	Fluor Bicuspidatus Diaphanus. W. curiosity.
2. TAWNY SPAR.							
Large	hard	heavy	uneven	YELLOWISH	bitumi- nous	the Swedish iron mines	Fluor Bicuspidatus Martialis. curiosity.

SPAR.

ORDER . III.

GENUS II.

CONNECTED SPAR.

FLUOR CONNEXUS.

Composed of two trigonal Pyramids, without any intermediate Columns.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. DIAMOND SPAR.							
Small	hard	very heavy	polish'd	PERFECTLY CLEAR	smooth	Ramel- sberg	curiosity.
							Dent des Cochons a deux Pointes. W.

SPAR.

ORDER III.

GENUS III.

COLUMNAR SPAR.

FLUOR COLUMNARIS.

Composed of a Column, terminated by a Pyramid.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. HEXAGONAL SPAR.							
Long sprigs	tender	heavy	glossy	WHITISH	flaky	Derbyshire	curiosity.
2. TETRAGONAL SPAR.							
Thick sprigs	hard	very heavy	flaky	YELLOWISH	rough	Yorkshire, lead mines	lime.
3. TRIGONAL SPAR.							
Short sprigs	soft	heavy	scaly	RUDDY	uneven	forest of Dean	an iron ore.

Spatum Crystallinum
Hexangulare.
W.

Fluor Columnaris
Tetragonus,
N.

Fluor Columnaris
Trigonus.

S P A R.

O R D E R III.

G E N U S IV.

P R I S M A T I C S P A R.

FLUOR PRISMATICUS.

In form of an angulated Column, without a Pyramid.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR	QUALITIES.	PLACE.	USES.
I. SIX-SIDED SPAR.							
Coarse shoots	tender	heavy	rugged	BROWNISH	friable	Lancashire	lime. Spatum Prismaticum Hexangulare. W.
2. ABRUPT SPAR.							
Amass of short pieces.	hard	very heavy	smooth	RUDDY	confus'd together	Sweden	lime. * Spatum Prismaticum Truncatum. W.
3. MANY-SIDED SPAR.							
Short sprigs of fourteen fides	very hard	heavy	glossy	YELLOWISH	uneven	Derbyshire, lead mines	lime. Spatum Crystallinum Tetradeca hedrum. W.

* Wallerius saw this six sided : all my pieces are very ill determin'd in this article, breaking ill from the mass.

R.

A

P

S

III.

R

E

O

V.

S

U

N

E

PYRAMIDAL SPAR.

FLUOR PYRAMIDALIS.

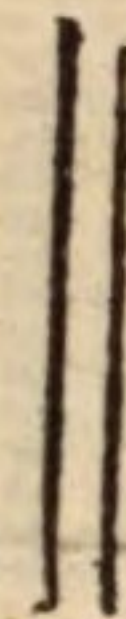
In form of Pyramids, without any Column*.

* These are usually found in great clusters in the cliffs of Rocks of Limestone.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. POLYGONAL SPAR *.							
A broad base and fourteen sides	hard	heavy	polish'd	YELLOWISH	in great clusters	Cornwall	Fluor Pyramidalis Polygonus. a flux for ores.
2. ELEVEN EDG'D SPAR.							
Short	tender	very heavy	glossy	RUDDY	cluster'd	iron mines in the Hartz	Spatum Pyramidale Endeca-hædrum, W. an iron ore.
3. EIGHT SIDED SPAR.							
Irregular masses	very hard	heavy	polish'd in some parts	YELLOWISH	clusterly	lead mines, Derbyshire	Spatum Pyramidale Octa-hædrum, W. lime.

* This seems the other half of the preceding Species, but always separate.

S P A R.



O R D E R III.

G E N U S VI.

O B L I Q U E S P A R.

S U I L L U S.

In form of cluster'd Prisms, cut off obliquely at the top.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. BROWN OBLIQUE SPAR.							
Uneven clusters	tender	heavy	polished	DARK BROWN	stinking when rub'd	Germany, and Norway	Lapis Suillus Prismaticus. W. a flux for ores.
2. RADIATED OBLIQUE SPAR.							
Uneven masses	soft	heavy	unequal	GREY	very stinking	Denmark	Lapis Suillus Radiatus. W. curiosity.
3. GLOBULAR OBLIQUE SPAR.							
Rounded masses	hard	heavy	botryoide	BRIGHT BROWN	fulphureous when struck	Norway	Lapis Suillus Sphericus. W. lime.

The Colour, as well as scent of these Spars, goes off in the fire: they require but a slight heat to render them as white and sweet as the other Spars: nor is it wonderful that sulphur should predominate so much in one kind, more than others. But 'tis singular, that the form of these Species is their own, and is indeed a certain Generic character; and that the abundant sulphur always attends it.

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FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. CLEAR CUBIC SPAR.							
In great com- plex clusters	soft	heavy	polished	COLOUR- LESS	multi- tudes mix'd to- gether rudely	Derbyshire	Spatum Crystallizatum Cubicum. W. lime.
2. BROWN CUBIC SPAR.							
In thick clusters	hard	heavy	smooth	YELLOWISH BROWN	confus'd in clusters	Cornwall	Drusa Fusca. a flux for ores.
3. PURE WHITE CUBIC SPAR.							
Small and distinct	soft	very heavy	glossy	PERFECTLY WHITE	loose and free	Gloucester- shire, in iron mines	Drusa Lactea. curiosity.
4. GREY CUBIC SPAR.							
Small clusters	hard	heavy	scaly	GREY	connect- ed, but not confus'd	Germany, in iron rocks	Drusa Grisea. a flux.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
5. TAWNY CUBIC SPAR. In great con- fus'd masses	brittle	very heavy	rugged	YELLOWISH BROWN.	confus'd clusters	Forest of Dean	a flux. Drusa Fulva.
6. PURPLE CUBIC SPAR. Small, and single	very hard	heavy	polish'd	AMETHY- STINE	distinct and perfect	Norway	curiosity. Drusa Amethystina.
7. RED CUBIC SPAR. Separate cubes	hard	very heavy	glossy	FINE RED	pure and free	Spain	a gem. Drusa Rubescens.
8. BLUE CUBIC SPAR. Loose clusters	tender	very heavy	polish'd	BRIGHT BLUE	connect- ed, not confus'd	North America, in copper mines	a false gem. Drusa Cerulea.

9. DEEP-GREEN CUBIC SPAR.	Small clusters	soft	heavy	scaly	DEEP GREEN	small masses	Sweden	a flux.	Druſa Viridis.
10. PURPLE CUBIC SPAR.	Diſtinct	ſoft	heavy	flaky	DEEP PURPLE	ſingle	Germany	a flux.	Druſa Violacea.
11. AQUA MARINE CUBIC SPAR.	Small clusters	tender	heavy	gloſſy	BLUE GREEN	diſtinct, tho' connected	Hartzforeſt	a flux for ores.	Druſa Cæruleo Virens.
12. EMERALD CUBIC SPAR.	Large clusters	hard	very heavy	poliſhed	PERFECT FINE GREEN	connected	Norberg	a flux for metals.	Druſa Smaragdina.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
13. LEMON CUBIC SPAR.							
Vast masses	very soft	heavy	scaly	PALE, BUT DEAD YELLOW	confused	the Hartz	a flux for ores. Drusa Pallascens.
14. VIOLET CUBIC SPAR.							
Distinct, and small	hard	heavy	polished	VIOLET COLOUR'D	scarce connected	Gilfloss	a false gem. Drusa Violacea.
15. BLACK CUBIC SPAR.							
In large clusters	very hard	very heavy	glossy	BLACK	connect- ed, not confused	France, where there is TIN	curiosity. Drusa Nigra.
16. DEEP-GREY CUBIC SPAR.							
Small clusters	soft	heavy	polished	DEEP GREY	confused	Cornwall	a flux. Drusa Griseofusca.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE,	USES.
17. BLUE-GREY CUBIC SPAR.							
Small clusters	hard	very heavy	glossy, but flaky	BLUE GREY	connected	Sandfwaer, in Norway	a flux. Drusa Subcærulea.
18. GARNET CUBIC SPAR.							
Loose and free	soft	heavy	polished	FINE RED	scarce connected	Alface	a false gem. Drusa Rufa.
19. RUBY CUBIC SPAR.							
Small clusters	hard	very heavy	glossy	BRIGHT RED	almost free	Schemnitz	a false gem. Drusa Rubea.

S P A R.

O R D E R V.

A N D R O D A M A N D E S P A R.

A N D R O D A M A S.

Oblong, and affecting the parallelloiped Figure.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. WHITE ANDRODAMANDE.							
In large masses	very soft	heavy	polish'd	CHALKY	brittle	Sneeberg	lime. Androdama Alba.
2. YELLOW ANDRODAMANDE.							
Vast masses	tender	heavy	flaky	DULL YELLOW	shattery	America	lime. Spatum Pellucidum Flavescent. W.
3. TAWNY ANDRODAMANDE.							
Great masses	soft	very heavy	glossy	BROWNISH YELLOW	brittle	Anderasberg, in Germany	a good flux. Spatum Pellucidum Croceum. W.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
4. BLACK ANDRODAMANDE.							
Small clusters	hard	very heavy	glossy	DEEP BLACK	brittle	Goffelaer, in Saxony	a tin ore. Spatum Pellucidum Nigricans. W.
5. GREEN ANDRODAMANDE.							
Small clusters	soft	heavy	polished	FINE GREEN	brittle	Switzerland	a false gem. Androdamas Smaragdinu Scheukz.
6. MARBLED ANDRODAMANDE.							
Great masses	hard	very heavy	veiny	YELLOW, VEIN'D WITH RED AND BROWN	brittle	Switzerland	lime. Spatum Pellucidum Venosum. W.

S P A R.

O R D E R VI.

I R R E G U L A R S P A R S.

3 P A T U M E F F L O R E S C E N S.

Uncertain in its Angles, but throwing itself into complex elegant Forms.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. ROSE SPAR.							
Large rose-like masses	tender	heavy	flaky	DEAD WHITE	hollow	Sweden, in lead mines	Spath Crystallisee en Roses. W. a flux.
2. HEDGE HOG SPAR.							
Small masses	hard	light	unequal	GREYISH	convex	Italy	Spathi Echinorum Imperati. curiosity.
3. LAMELLATE SPAR.							
In vast flattened masses	hard	heavy	gill'd like mushroom rooms	WHITE	lightly convex	Germany	Spatum Plexum Tetradekahædram. W. lime.
4. BROKEN SPAR.							
Great lumps	very hard	heavy	smooth	BROWNISH	form'd of half octagons	Sweden	Spatum Dimidiatum. W. a flux.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
5. DECUMBENT GRAPE SPAR.							
Large clusters	soft	heavy	glossy, but rising in lumps	PALE BROWN	brittle	Sax Weiffen- fels, in Norway	lime. Spatum Botryiticum. W.
6. CYLINDRIC SPAR.							
Great masses	soft	very heavy	glossy	PALE YELLOWISH	brittle	Bispsberg, in Sweden	lime. Spatum Cryсталisatum Cylindricum. W.
7. GLOBULAR SPAR.							
Round lumps	hard	heavy	smooth	BROWNISH	firm	Hartz forest	lime. Spatum Cryсталisum Globosum. W.

S P A R.

O R D E R VII.

D E B A S E D S P A R.

S P A T H U R A.

Alter'd in its aspect and qualities by a mixture of other matters.

G E N U S I.

S A N D S P A R.

S P A T H U R A A R E N A C E A.

Granulated irregularly, and having an aspect of lumps of Sand.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. WHITE SAND SPAR.							
Rude masses	brittle	heavy	uneven, and irregular	GREYISH WHITE	composed of various sized particles	Twyebrook, in Sweden	Spatum Arenaceum Album. W. a flux.
2. YELLOW SAND SPAR.							
Small clumps	shattery	heavy	uneven	BROWNISH, YELLOW, AND GREY	confused, and coarse	Germany	Spatum Arenaceum Cinereum. W. a flux.
3. RUDDY SAND SPAR.							
Rough lumps	very hard	very heavy	uneven, and rough	DEEP RED	irregularly mixed	Forest of Dean	Spatum Arenaceum Rubrum. W. a flux.

SPAR.

ORDER VI.

GENUS II.

GLASS SPAR.

SPATHURAVITREAE.

Glassy, firm, solid, and shapeless.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. CLEAR GLASS SPAR.							
Large nodules	very hard	heavy	uneven, but glossy	COLOUR- LESS	breaking into rude cubes	Stalberg	curiosity.
2. GREY GLASS SPAR.							
Rude Lumps	very hard	heavy	polish'd, but uneven	GREYISH WHITE	breaks in angulated frag- ments.	Hartz forest	curiosity.

1. CLEAR GLASS SPAR.

Large
nodules

very hard

heavy

uneven,
but
glossyCOLOUR-
LESSbreaking
into rude
cubes

Stalberg

curiosity.

Spatum
Scintillans.
L.

2. GREY GLASS SPAR.

Rude
Lumps

very hard

heavy

polish'd,
but
unevenGREYISH
WHITEbreaks in
angulated
frag-
ments.

Hartz forest

curiosity.

Spatum Lateribus
Nitidis.
W.

S P A R. A

O R D E R VI.

G E N U S III.

P Y R I T I C S P A R.

S P A T H U R A P Y R I M I C H A.

Irregular, botryoide, and striated.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. RUDDY PYRITIC SPAR. Oblong lumps	brittle	very heavy	raised in bumps	RUDDY BROWN	sulphureous, when broken	Forest of Dean	Spatum Pyrimachum Rubrum. W. curiosity.

All the debased Spars have more or less of various mixtures in them, and therefore manifest their characters as Spar, less freely; but there is always more or less of the calcarious quality in them; and when broken, if not while whole, they shew somewhat of the cubic form in their particles.

S P A R.

O R D E R VII.

C U R T A I N ' D S P A R.

S T I R I A.

Hanging over the walls of caverns in form of folded curtains.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. PURE CURTAIN'D SPAR.							
Vast sheets	brittle	heavy	polished, and glittering	COLOUR- LESS	flaky, when broken	Grotto of Antiparos	for slabs and or- naments.
2. YELLOW CURTAIN'D SPAR.							
ORIENTAL ALABASTER.							
Wav'd sheets	tender	heavy	polished, and undulated	PALE YELLOW, VARIOUSLY VEIN'D	breaks in freaky flakes	Ægypt; also Cornwall	for ornaments.

Stiria
Decolor.

Stiria
Flavescens.

3. PURPLE CURTAIN'D SPAR.
ROOT OF AMETHYST.

Stiria
Amethystina.

Thick coats

hard

heavy

uneven,
but
glossy

GREY,
BLOTCH'D
WITH PUR-
PLE, OR
OTHER
COLOURS

breaks
unevenly,
and
crackly

Derbyshire
for ornaments.

4. WATER SPAR.

Stiria
Fulca.

In crufts in
tea-kettles

brittle

light

uneven,
and
rough

DIRTY
GREY

striated

every where

none.

5. AERIAL SPAR.

Stiria
Aeria.

Fine coats

hard

heavy

smooth,
and
even

BROWNISH
YELLOW

striated,
when
broken

in the pipes
of fire en-
gines in the
Cornish
mines where
only vapour
comes

curiosity.

S

P

A

R.

ORDER VIII.

STALACTITIC SP. A. R.

STALACTITES.

In form of Icicles hanging from the roofs of caverns.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. WHITE STALACTITE.							
Long cones	brittle	heavy	uneven, but polished	WHITISH	flaky, when broken	roofs of caverns, Antiparos, and Derbyshire	Stalactites Albus. an ornament for grottos.
2. GREY STALACTITE.							
Thick cones	hard	heavy	rumpled, and uneven	GREYISH	shattery	limestone caverns, Derbyshire	Stalactites Griseus. W. for grotto work.
3. CHALKY STALACTITE.							
Coarse cones	soft	light	wav'd, and rumpled	PURE WHITE	dufty, when broken	vaults and arches, Windsor, &c.	Stalactites Cretaceus. for grottos.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
4. RED STALACTITE.							
Short cones	brittle	very heavy	wav'd	RED	irregular, when broken	Derbyshire	Stalactites Ruber. W. none.
5. BLACK STALACTITE.							
Slender cones	very hard	heavy	rumple	DEEP BLACK	flaky, when broken	Grapenberg, in Sweden	Stalactites Niger. W. for grottos.
6. FOLIACEOUS STALACTITE.							
Thick cones	soft	heavy	uneven, and as it were leafy	YELLOWISH	thin flakes, broken	Hartzforeft	Stalactites Feuillette. W. for grottos.

S P A R.

O R D E R IX.

S T A L A G M I T I C S P A R.

S T A L A G M I T E S.

Form'd into globular Figures, coated as an Onion.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	U S E S.
1. SUGAR-PLUM STALAGMITE.							
Small, round lumps	soft	heavy	scaly	PURE WHITE	thin coated	Italy	curiosity.
2. GREY STALAGMITE.							
Round lumps	hard	heavy	bubbled	BROWNISH GREY	thick coated	Sweden	lime.
3. OVAL STALAGMITE.							
Small, oval lumps	tender	heavy	smooth	YELLOWISH	crackly	Zweybreck, in Sweden	lime.

Stalagmites
Orobias.
W.

Pisolithus.
W.

Orobias
Scheuk.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
4. FISH-SPAWN STALAGMITE.							
Great stony masses, of lit- tle oval lumps	soft	light	smooth	WHITISH	tender	Ketton, in Rutland	a building stone. Meconites Scheuk.
5. SAND STALAGMITE.							
Stony masses of small grains	hard	heavy	rugged	REDDISH	shattery	Cornwall	a flux. Ammitea, B.
6. BLACK STALAGMITE.							
Small masses	very hard	heavy	scaly	DEEP BLACK	thin coated	Nerike, in Sweden	a flux. Cenchrites Niger Scheuk.

SPAR.

ORDER X.

INCRUSTING SPAR.

INCRUSTATIO.

Forming a stony coat upon moss, or shells, or other substances.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. BROWN INCRUSTING SPAR.							
A thin coat	very soft	light	rugged	PALE BROWN	brittle	Yorkshire, in waters	curiosity. Incrustatio Fulca.
2. GREY INCRUSTING SPAR.							
A thick coat	hard	heavy	wavy	GREYISH	firm	Sweden, on shells	curiosity. Incrustatio Albida.
3. RUDDY INCRUSTING SPAR.							
Rude coats	tender	very heavy	uneven	REDDISH	brittle	forest of Dean	curiosity. Incrustatio Rubescens.

THESE, so far as I have yet seen, are all the Species of Spar: but so many there are; and thus they may be arranged in a cabinet. They are more than is usually thought: but the eye shews them; and their existence cannot be disputed.

If the term Species be question'd, and it be said, that many here called such, are only Varieties; I cannot agree to that term as a subdistinction, tho' many, and great names support it. I should be sorry, any of those Authors entered into a dispute about it; for I should be obliged to tell them, that there is no real distinction of Species in Spar. Spar is but one body, and all its appearances are Varieties: however, the numbering them as Species, fixes their names; and ascertains the account, without the confusion of a useless subdistinction.

T H

Heavy watery Vapour

thel Acid

they

Solus Vetus

Solus Vetus

Solus Vetus M.

Solus Decolor

Solus Elaviscus

Solus Viscerarius

Solus Evis

Solus Cereus

Solus Kaper M.

Solus Mager M.

Solus Emulgete M.

Diuis Solus

Diuis Solus

Diuis Solus

Diuis Solus

Diuis Solus

Diuis Viscerarius

Diuis Evis

Crystallum Tetradeca-hedrum

Pyramidalis Polygonus

Pyramidalis Endera-hedrum

Pyramidalis Endera-hedrum M.

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Mineral Acid - Acidulated Water

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Harris

Gypsum Opacum
Lapis Hepaticus
Schistes Flavus
Hepaticus Niger
Gypsum Virens
Schistes Verticillor

then into
Citra Rara
Gubr Cinctum
Ferrum Commun

Gyffations
Pyrites Riger
Mellius

transing this

Heavy

Water

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Hill, John

Spatogenesis

London 1772

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